Annual Report of the Board of Public Health Works Bombay Presidency

For the Year 1933-34

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ANNUAL REPORT OF THE BOARD OF PUBLIC HEALTH WORKS, BOMBAY PRESIDENCY, FOR THE YEAR ENDING 31st MARCH 1934.

The constitution and functions of the Board of Public Health Works remained the same as last year throughout the year under report.

2. The personnel during the year was as follows :—

President.

The Commissioner, Central Division, Poona—

W. W. Smart, Esq., B.A., Dip.Agr., I.C.S., J.P.

Members.

The Secretary to Government, General Department—

R. B. Ewbank, Esq., C.I.E., B.A., F.L.S., I.C.S., J.P. (up to 16th March 1934).

H. F. Knight, Esq., B.A., I.C.S., J.P. (from 17th March 1934 to end of the year).

The Chief Engineer and Joint Secretary to Government, Public Works Department—

P. L. Bowers, Esq., C.I.E., M.C., A.M.I.C.E., J.P. (up to 31st October 1933).

The Chief Engineer and Secretary to Government, Public Works Department—

C. M. Lane, Esq., I.S.E. (from 1st November 1933 to end of the year).

The Director of Public Health for the Government of Bombay—

Dr. R. V. Shiveshwarkar, B.A., M.B.B.S., D.P.H., D.T.M. (up to 13th April 1933).

Major A. Y. Dabholkar, M.C., M.B.B.S., B.Sc., D.P.H., D.T.M. & H. (Lond.), I.M.S. (from 14th April 1933 to end of the year).

Non-Official Member.

Hoosenally M. Rahimtoola, Esq., B.A., M.L.C., J.P.

Member and Secretary.

The Consulting Public Health Engineer to Government—

V. G. Shete, Esq., L.C.E., M.I.E. (Ind.), M.R.San.I., A.M.I.San.E.

The Board's executive functions have been hitherto carried out by the Superintending Engineer, Public Health, Bombay. Due to retrenchment, on the recommendations of the Reorganization Committee, the

Public Health Branch of the Public Works Department has been closed down from 1st March 1933 and consequently the construction of Public Health works is now carried out by the regular Public Works Department staff of the Divisions concerned.

It was decided by Government that the Public Health Branch should be reconstituted as a consultant branch only under a Specialist Officer and the head of the Branch was designated "Consulting Public Health Engineer to Government" with the following staff for his office :—

1 Assistant Consulting Public Health Engineer to Government;
1 Personal Assistant;
1 Head Clerk;
4 Clerks;
1 Draftsman;
2 Tracers; and
Menial establishment.

This officer besides being the Consulting Engineer to Government in respect of all public health works which may be inaugurated by Government has to scrutinise and report on all such schemes prepared by local or outside bodies when submitted to Government for approval and to inspect their progress during the course of his annual tours. All Public Health schemes to be carried out from loan funds, whether prepared by Government or outside agencies for local bodies are to be submitted for scrutiny of the Consulting Public Health Engineer as regards the technical details and are to be administratively approved by the Board of Public Health Works before being undertaken for construction.

3. Fees are now charged for consultation, scrutiny of plans and for superintendence on the following scales which have been fixed by Government :—

(1) *For preliminary investigation and report.*—For a local body—no charge. For outside body the daily pay of the officer making the investigation and the staff which accompanies him from the date of leaving headquarters till the date of return *plus* 50 per cent. for a period not exceeding seven days.

For periods in excess of seven days the charge will be as above for the first seven days, and thereafter

Daily pay of the officer making the investigation and the staff which accompanies him *plus* 100 per cent.

In all cases the travelling and halting allowances of the Consulting Public Health Engineer and his staff will be paid by the local or outside body concerned.

(2) *For carrying out detailed surveys in connection with a project.*—The estimated cost of the survey, including cost of establishment to be engaged, shall be recovered.

(3) *For preparation of a project complete with all necessary drawings and estimates.*—2½ per cent. of the estimated cost *less* the amounts paid under (1) and (2) above.

(4) *For scrutiny by the Consulting Public Health Engineer of a project prepared for a local or outside body by an agency other than the Public Works Department.*—1¼ per cent. of the estimated cost of the project.

(5) *Inspection by the Consulting Public Health Engineer of Public Health Works under construction, if constructed by an agency other than the Public Works Department.*—1¼ per cent. of the estimated cost of the project.

If the Consulting Public Health Engineer is asked to act continuously as consultant for any work and has accordingly to visit that work from time to time as it progresses, the charge will be 1¼ per cent. If at the request of the local body he pays an occasional visit, the charge will be Rs. 100 *plus* the actual expenses of journey *plus* usual travelling allowances etc., but no charge is made for visits made by him on his own initiative or advice offered on such visits or for visits by the engineer of local bodies to him at his office to consult him about any particular point that arises.

(6) *Construction of works by the Public Works Department on behalf of a local body.*—Establishment and tools and plant charges at 15 per cent. of the estimated cost of the project inclusive of 2½ per cent. for preparation of plans and estimates.

An application for raising a loan either from Government or in the open market is only sanctioned after a Public Health scheme has been approved administratively by the Board of Public Health Works and technically by the Consulting Public Health Engineer to Government.

Moreover, public health works financed from loans taken by local bodies are, if executed by their own qualified agency, subject to control and inspection by the Consulting Public Health Engineer according to rules framed under the Local Authorities Loans Act. But, where the local body does not either possess a staff, or employ a qualified agency, capable of carrying out the work on approved lines, Government would impose a condition that the work should be carried out by the Agency of the Public Works Department.

4. Two meetings of the Public Health Board were held during the year under report. In addition, matters that came up before the Board subsequently were also dealt with by circularising the members.

The Board accorded approval to the undertaking of preparation of the following projects by the respective Executive Engineers :—

(1) Mahad Water Supply	..	Executive Engineer, Ratnagiri Division.

(2) Improvements to Barsi Water Supply.	Executive Engineer, Sholapur Division.	
(3) Barsi Drainage ..	Do.	do.
(4) Improvements to Pandharpur Water Supply.	Do.	do.
(5) Remaining portion of outfall sewer and disposal works including sewage farm at Sholapur.	Do.	do.
(6) Water Purification Works at Sholapur.	Do.	do.
(7) Nandurbar Drainage, IV Stage—Lateral Branches.	Executive Engineer, Khandesh Division.	
(8) Jejuri Water Supply ..	Executive Engineer, Poona Irrigation Division.	

The following projects were approved and execution of the same authorized to be undertaken by Government agency through the respective Executive Engineers or by the local bodies themselves :—

Serial No.	Names of projects.	Estimated Net Cost.	Execution by	
			Government Agency.	Municipal Agency.
1	2	3	4	5
		Rs.		
1	Improvements to Chiplun Water Supply.	1,96,200	Executive Engineer, Ratnagiri.	
2	Bhiwandi Water Supply Improvements.	12,050	Executive Engineer, Thana.	
3	Shikarpur Drainage, Part II—Stage II and other correlated works.	5,69,276	....	Shikarpur Municipality.
4	Improvements to Distribution System, Sholapur.	5,07,500	....	Sholapur Municipality.
5	Extension of Outfall Sewer, Sholapur.	75,200	....	Do.
6	Bandra Drainage ..	7,32,200	....	Bandra Municipality.
7	Ahmedabad Suburban Drainage (I Stage).	7,49,540	....	Ahmedabad Municipality.
8	Khar Drainage, Bandra ..	1,43,000	....	Bandra Municipality.
9	Laying water mains in the developed areas at Karachi.	58,000	....	Karachi Corporation.
10	Karachi Supplementary Drainage Scheme.	4,05,000	....	Do.
11	Improvements to Jalgaon Distribution System.	1,64,300	....	Jalgaon Municipality.

Amongst others, the following important points were also considered :—

(*i*) In view of the change in policy of Government regarding granting of subventions to local bodies for sanitary schemes, the Board resolved to revise their powers and functions consistent with Government orders. A note embodying the existing and the proposed statutory powers to be taken by Government, constitution of the Board of Public Health Works and the duties of the Consulting Public Health Engineer to Government was drafted and submitted to Government with a recommendation that the powers required to be taken should be to make the Board statutory on the lines of the Board of Revenue in Madras.

(*ii*) The Mutha River Improvement project to canalise the river bed with a view to afford amenities for people residing along the river front, involving the lowering of water of the Mutha-Mula River, impounded above the Jamshetji Bund. On careful consideration, the Board resolved that Government be recommended—

(1) to permit the Poona City Municipality to carry out in full the contemplated improvements in the hot weather of 1934 ;

(2) to permit the lowering of the water level to 3 feet only from 1st April 1934 to 5 feet after 1st May 1934 till the monsoon floods arrive to enable the Municipality to execute the necessary works ; and

(3) that it does not appear advisable to allow a permanent lowering of water level more than 2 feet.

Government have accordingly permitted the Poona City Municipality to carry out the improvements and the Municipality have also partially carried out the work with satisfactory results.

5. The Public Health works in progress (executed either by local bodies or Government agency) during the year under report were as follows :—

WATER SUPPLY SCHEMES.

SIND.

Hyderabad.—(1) Enlarging the Bazar main, (2) Installing additional pumps at the Fort Lift Pumping Station, (3) Gidu and Transfuleli Water supplies were completed and handed over to the Municipality for maintenance which cost them Rs. 1,58,703 (inclusive of interest and sinking fund charges) during the year for a total annual supply of 1,044 million gallons. Laying of additional distribution pipes and other improvements by municipal staff have been carried out at an expenditure of Rs. 3,523.

The Hyderabad Filtration Scheme has been prepared and sanctioned. The execution of the scheme is held up pending provision of funds. The Municipality is also advised to provide improved arrangements for their intake works at the Gidu Pumping station, where a new electrically driven pumping unit has been installed during the year to replace the old steam plant.

Jacobabad.—The original work estimated to cost Rs. 2,15,000 sanctioned under Government Resolution, Public Works Department, No. 16, dated 4th July 1927, was completed and handed over to the Municipality in April 1932. From the savings on this work the construction of an additional third supply well 25′ diameter and 23′ deep was undertaken for execution by Government agency and completed during the year by the Executive Engineer, Begari Canals Division. The expenditure on the same during the year amounted to Rs. 5,078.

The expenditure incurred on maintenance of head-works pumping station throughout the year was Rs. 5,466. The running expenses for a total annual supply of 29·79 million gallons was 2·9 annas per 1,000 gallons.

Karachi.—The insufficiency of the present supply is felt very seriously by the population of Karachi and at the beginning of every hot weather the Corporation is faced with danger of failure of supply. With a view to meet the growing needs of Karachi, investigations for finding out new sources of supply were carried out.

The Consulting Public Health Engineer to Government submitted a preliminary report in which he advised the Corporation to take the river Indus as their new source for an unfailing supply. Four possible schemes for bringing water from the Indus were worked out—

(1) An intake at the head of Kalri canal at Tatta which is 61 miles by rail from Karachi up to Jungshahi station *plus* 11 miles by road from railway station to town ;

(2) An intake at Quoreshi Pir 11 miles upstream of Tatta and about 74 miles from Karachi ;

(3) An intake at Jherruck 12 miles from Meting railway station, the latter being 89 miles from Karachi ;

(4) An intake at Kotri railway station about 109 miles from Karachi.

The first proposal is technically out of the question. No. (2) will involve a capital expenditure of Rs. 130 lakhs, or Rs. 180 lakhs according to the route of the pipe line. No. (3) and No. (4) involve a capital expenditure of Rs. 269 and 285 lakhs respectively. The Corporation has been advised to work up in detail either the Quoreshi Pir scheme No. (2) being the best suited and least costly, or No. (3) (Jherruck) which is the safest, being free from the vagaries of the river. The Corporation are seriously considering the financial aspect of the question. Side by side with this, the Corporation has been advised to revise and take up extensive improvements to the water supply distribution system. The following two schemes estimated to cost Rs. 58,000 have been recently sanctioned by the Board of Public Health Works and the Corporation propose to finance them from loan funds :—

(1) Laying water mains in the lower middle class housing area, section 1.

(2) Laying water mains in the developed area and sewage farm No. 1.

During the year the following extensions to the present water works system were carried out by the Municipal staff :—

(*a*) Completion of the extension of the dry stone gallery at Dumlotte gorge.

(*b*) Completion and opening of Pumping station at well No. 7. Expenditure Rs. 30,010.

(*c*) Laying additional distribution mains in the town. Expenditure Rs. 22,689.

The maintenance of the present headworks with its several pumping stations and the distribution system in the town has cost the Corporation Rs. 1,47,766 during the year, for a total supply of 2,581 million gallons including the interest and sinking fund charges for capital invested for these works ; the total annual charges amounted to Rs. 5,00,462.

Sukkur.—The Sukkur Water Works were visited by the Consulting Public Health Engineer to Government in January 1934. The Municipality has been advised to take in hand improvements to their water works to meet the growing demands of the increased population in suitable stages on the basis of a supply of 30 gallons per head per day. For further stages of the scheme, they have been advised to provide for sufficient machinery and filter plants and erect an additional service reservoir to regulate supply of water to the town. The Municipality are at present engaged in remodelling their distribution system for which they have been granted a loan in 1933. The detailed working plans and estimates for a revised distribution system are being drawn up by the municipal staff.

The present method of chlorination of water by bleach solution has been found to be defective and the attention of the local body has been drawn to replace the method immediately by installing a proper sized chloronome using liquid chlorine. The maintenance of all the works including pumping station and filters is being done by the municipal staff and has cost Rs. 92,964 for an average supply of 1 to 1·3 million gallons daily.

Northern Division.

Ahmedabad.—The town is rapidly growing and the works provided are proving inadequate to its needs. Investigations for finding additional sources of supply are being carried out. For giving relief during hot weather, the Municipality was advised to keep working all the three pumping units for full 24 hours and to provide an additional elevated storage capacity of one million gallons, which they have done. The total quantity of water supplied to the town during the year amounted to 5,078 million gallons for which the annual recurring maintenance expenditure amounted to Rs. 1,39,642 giving a rate of a little less than half anna per 1,000 gallons.

Bhiwandi.—The Municipality was supplied with plans and estimate, the latter amounting to Rs. 12,050. The scheme consists of providing—

(1) 3″ inlet, 12″ sluice valves to filters and one 12″ sluice valve with drainer into the masonry tank;
(2) stopping the leaks in the masonry dam;
(3) stopping the leaks to the waste weir;
(4) providing 12″ C. I. supply main from stock in place of 6″ pipes;
(5) providing 4″ S. W. pipe drains to standpost in town.

The Municipality has entrusted execution of items (1) and (4) of the scheme to the Executive Engineer, Thana Division, and the work is in progress.

Kapadwanj.—Details of five water supply lines were scrutinised and the Municipality laid a total length of 434 feet at a cost of Rs. 493. The headworks pumping station and water supply works were managed by the Municipality. The total quantity of supply pumped and delivered was 52·6 million gallons and the annual working expenses were Rs. 15,443.

Salsette.—The expenditure on works of additions and alterations (such as laying of water mains etc.) carried out during the year amounted to Rs. 17,496. The total quantity of water delivered for the whole year amounted to 732·5 million gallons and the annual recurring expenditure on the maintenance of Water Works to Rs. 3,16,084, the major part of the expenditure being incurred on the purchase of water from the Bombay Municipality (Rs. 2,97,053).

Surat.—As a further stage of improvement to their water supply, the Surat Municipality has been advised to take up the third stage of water supply improvements consisting of (1) enlarging the trunk main from Chowk to Athwa gate, and (2) enlarging the Varachha main from 22″ to 36″ for a distance of 14,000 feet. The Municipality has entrusted for execution to the Executive Engineer, Surat and Broach Division, the urgently needed part of the scheme to improve the pressure on the Athwa gate side from which the supply to the old Cantonment area and the Police Lines is taken. The existing mains of 9″, 7″ and 4″ diameter to a total length of 5,700 Rft. will be replaced by 15″, 13″, 9″ and 7″ diameter pipes. The final surveys, such as fixing the alignment of the ground, preparation of working drawings and estimates and all preliminary arrangements to start the work, were completed by the end of the period under report. The total expenditure incurred during the year 1933–34 for the above work was Rs. 2,133. The total quantity of water supplied to the town by the Municipality amounted to 1,195 million gallons during the year at an annual recurring expenditure of Rs. 46,940.

Thana.—The Municipality was advised to revise their distribution system which is very defective. Plans and estimate for a revised system, estimated to cost Rs. 3,08,600 net have been already supplied to the Municipality, but no action has yet been taken by the local body. The

total quantity of water delivered to the town amounted to 110 million gallons and the annual charges for the same amounted to Rs. 49,589. At present part of the supply is received from the municipal tank at Pokhran and part is received from the Tansa main of the Bombay Corporation and from the railway reservoir.

CENTRAL DIVISION.

Ahmednagar.—The Water Works of this place has now been fully handed over to the control of the Municipality. The supply is chlorinated but not filtered. The local body has been advised to improve the turbidity by aluming the supply at suitable points and the distribution system to secure even distribution of supply to the newly developing colonies.

The total supply delivered to the town during the year was 273 million gallons, approximately ¾ million gallons per day at an annual cost of Rs. 58,804 including Rs. 51,000 for repayment of the loan for capital works.

Alandi.—The total quantity of supply pumped, treated and distributed to the town including Kartiki fair requirements amounted to 0·276 million gallons and the annual recurring charges amounted to Rs. 3,986.

Ambernath (Bombay Suburban Scheme No. 21) :—

New mains 4" to 1" in size for a total length of 2800 feet were laid and meters for use of public were provided,—total capital expenditure Rs. 1,678. The total quantity of water pumped amounted to 47·25 million gallons of which 32·14 million gallons were delivered to consumers. The dose of alum was 1·75 and 0·75 grains per gallon during monsoon and hot weather months respectively. Chlorine treatment was started from December 1933 and the dose was 6·5 lbs. per million gallons. The annual maintenance cost, exclusive of interest and sinking fund for capital charges, was Rs. 23,746 and the assessed revenue was Rs. 28,638.

Barsi.—Some of the localities of this City do not get sufficient water from the pipe lines already laid. It has therefore been decided to construct two additional reservoirs from which water will be served to these high level areas. Plans and estimates are being prepared by the Executive Engineer, Sholapur Division.

The total supply delivered to the town during the year amounted to 212 million gallons and the annual recurring expenditure for maintenance of Water Works to Rs. 25,934.

Bhimashankar.—This is a pilgrim centre visited mostly in the month of February. The supply is available from only an artificial tank cut in rock in which water is stored during monsoon days for use in fair days. The storage was comparatively very small and the old masonry structure on one side of the tank was badly leaking resulting in the maximum water level being very much below the designed level. New masonry side walls were therefore provided on north and west sides during the previous year and in the current year masonry was extended towards

south and south-west sides. The new water depth is expected to be about 10 feet instead of about 4 feet in the past. The supply is now arranged to be led to the camping ground by 3″ C. I. pipes with sufficient standpost accommodation erected annually for even distribution. The supply pipes are also further extended to the main temple area. The work which was undertaken by Government agency during the previous year was completed by the agency of the District Local Board during the current year.

Dhulia.—The Municipality seriously contemplate effecting improvements to their water supply system to cope with the demand for more water. The scheme drawn up in 1928 is now being revised at the request of the local body—the first stage to consist of Panjra headworks and the second stage for revision of the distribution system and reconditioning and relaying the Dedargaon 8″ main. The Municipality intends to float a loan in the open market to finance the scheme. The total supply delivered in the town by the present works was 109·5 million gallons and total annual charges amounted to Rs. 14,788 including interest and sinking fund instalments on loans raised.

Jalgaon.—The Girna water supply scheme has been completed and handed over to the Municipality for maintenance. Only the approach road to the water works remains to be constructed. It could not be taken in hand as the Municipality has not yet acquired the necessary land. The total quantity supplied during the year amounted to 351 million gallons at a running cost of Rs. 21,209, which is equal to 0·97 annas per 1,000 gallons.

The existing distribution system was laid in about 1898 to serve a prospective population of 20,000 at 15 gallons per head and has not been improved since that date. It is therefore no longer capable of dealing with the present or future estimated population at the increased rate of supply now available. At the request of the local body plans and estimate for remodelling the present distribution system on a constant supply basis of 34 gallons per head on the present population or 24 gallons per head on the prospective population of 50,000 after 30 years, were prepared and supplied to them. The local body intends to carry out the scheme by its own agency financing it from loan funds. Work will be started as soon as they are in receipt of the loan.

Jejuri.—The Municipality has entrusted preparation of their water supply scheme to the Executive Engineer, Poona Irrigation Division. Surveys are in progress.

Karad.—The work of providing new engines to replace old ones was completed during the year. The total quantity of supply delivered to the town after settlement and filtration amounted to 605 million gallons at an annual maintenance charge of Rs. 17,605 inclusive of interest and sinking fund charges. The work of laying a separate supply main to high level area in Somwar Peth is still left undecided by the Municipality as also extension of distribution system to growing areas on the Mamlatdar's Katcheri side.

All the headworks up to the elevated service reservoir are managed by Government and water is issued from this reservoir to municipal distribution system at a fixed charge of annas five per 1,000 gallons payable to Government by the Municipality.

Kopargaon.—The town of Kopargaon has a population of 7,000 according to the 1931 census. The people of Kopargaon have to take water for their domestic purposes from the Godavari river at a distance, which they find it most inconvenient and expensive. There are wells in the town and water that percolates to the wells is brackish. A piped water supply scheme has been drawn up by a private company estimated to cost Rs. 34,427 and is submitted to the Consulting Public Health Engineer for scrutiny. The Company proposes to put up the required works at its own cost and charge the local body for the supplies given at house connection rates according to the terms of agreement with the Notified Area Committee.

Lonavla.—The municipal water supply lake at Tungarli is the principal source of water supply to the town of Lonavla. Scarcity of supply was experienced year after year by the Municipality especially during the hot weather months. One of the causes of the scantiness of supply was depletion of the contents of the Tungarli lake by leakages in the masonry dam. The leaks had gradually developed to such an extent that it became imminent for the Municipality to get them repaired, and under the advice of the Consulting Public Health Engineer to Government the Municipality made arrangements with Messrs. Francois Cementation Company to make the dam water tight by injecting cement in the hearting of the dam through bore holes. The whole work was carried out under the supervision of the Consulting Public Health Engineer to Government; the expenditure incurred during the year amounted to about Rs. 35,000. The leakage has since been very considerably reduced.

Malegaon.—Schemes for providing piped water supply have been investigated—the alternative being either to bring in a gravitation supply from the irrigation canals or to obtain pumped supplies from the adjoining river Mosum or Girna. The comparative annual burden for either of the alternatives was discussed with the Municipality and it is expected that they will undertake the scheme after they have decided on the proposals to finance the annual burden.

Nandurbar.—The second stage of the water supply scheme is in progress. During the year under report about 5,000 feet of 4″ and 3″ diameter C. I. pipes and 1,800 feet of 2″ diameter C. I. pipes were laid and 8 standposts and 8 fire hydrants were constructed. Expenditure during the year was Rs. 37,926.

Pandharpur.—The existing steam units installed in the year 1911 having practically outlived their term of life, it was thought necessary to instal one new crude oil engine with a view to obviate any dislocation of the water supply system in case of a breakdown. The requisite funds having been provided by Government, arrangements are in progress to instal the new standby pumping plant.

A scheme to ensure water supply to the high level area is in course of preparation by the Executive Engineer, Sholapur Division. During the course of investigation it has been found possible to supply water to Pandharpur by gravitation and a scheme was investigated, with the Nira Right Bank Canal as the source, which is estimated to cost approximately Rs. 1,80,000. This proposal has been dropped as the canal water charges are too heavy, and as the Irrigation Department does not guarantee the supply throughout the year. The local body is in earnest to take in hand the high level scheme if it proves profitable and supply is assured throughout the year.

The total supply delivered to the town amounted to 280 million gallons including the requirements of the fairs and the total annual charge to the Municipality amounted to Rs. 47,682. The headworks are all managed by Government and the distribution system in the town by the Municipality.

The rate charged by Government for bulk supply is 2½ annas per 1,000 gallons up to a quantity of 450,000 gallons per day and three annas per 1,000 gallons for quantities in excess. The extra supply during fairs is charged at the rate of 3 annas per 1,000 gallons.

Nasik.—The following works under construction by Government agency were completed during the year under report :—

(1) providing and laying 24″ porous pipes 125 feet long ;

(2) construction of an inspection chamber in the bed of the river ; and

(3) replacing the existing 12″ C. I. pipes with 24″ porous pipes between the inspection chamber and the northern well.

The total expenditure incurred on all these items of capital works amounted to Rs. 2,707. Since the porous pipes were brought into operation, the supply received in the jack well is sufficient for keeping the present pumps going for all 24 hours. The total quantity of supply pumped and delivered to the town amounted to 299 million gallons and the annual working expenses were Rs. 66,460.

The whole of the Nasik water supply works require to be reorganized to keep pace with the increased demands of the growing population. The present works have by now more than reached their capacity and the Municipality was advised to take up the extension scheme as early as possible.

Poona—(a) Poona Cantonment Water Supply.—The work of erection of pumping plant for raw water pumping from canal, consisting of two new Bellis marcom high speed engines and 18″ Worthington centrifugal pumps, capable of lifting 275,000 gallons per hour to a total head of 40 feet was completed. Expenditure during the year was Rs. 11,963.

The work of remodelling the Mutha Right Bank Canal for impounding sufficient water to tide over canal closure periods was in progress. The gates controlling the supply for delivering to the City and Cantonment headworks, though in position, were not worked and so no benefit was

experienced by the Poona Cantonment Water Works which have shared the capital cost. The expenditure during the year was Rs. 6,381.

The quantity of water pumped during the year was 1,025 million gallons, of which treated and delivered quantities amounted to 941 and 875 million gallons respectively. The average supply was 2·57 million gallons per day. The dose of alum in monsoon was 1·58 grains per gallon and for other seasons it was 0·42 grains per gallon—average 0·91. The dose of perchloron of 68·4 per cent. available chlorine was 3·0 lbs. per million gallons.

The maintenance cost during the year amounted to Rs. 1,68,137 and the revenue assessed amounted to Rs. 3,95,960.

(*b*) *Poona City Water Supply.*—The work of remodelling the distribution system and the headworks was continued during the year. A new reinforced concrete elevated tank of two lakhs gallons capacity was constructed and a new electric pumping plant for supply to high level areas was installed of a capacity of 125,000 gallons per hour for a total lift of 58·54 feet. The expenditure during the year amounted to Rs. 59,166. The total quantity supplied to the City from canal source and Katraj source amounted to 2,426·45 million gallons and the annual maintenance charges amounted to Rs. 1,52,879 inclusive of cost of canal water paid to Government. The daily consumption is still in the neighbourhood of 50 gallons per head and there are yet no signs of its getting reduced. The maximum consumption during the hot weather had reached 9·5 million gallons per day.

(*c*) *Kirkee Water Supply.*—The quantity of water both from the Pashan lake and the Mutha Right Bank canal delivered through Holkar's Bridge Water Works pumping station amounted to 221 million gallons during the year, including raw water given to Ganeshkhind gardens. The dose of alum was 1·9 grains per gallon during monsoon and in other seasons it was 0·1 grain per gallon.

During hot weather when water contains algae, permanganate of potash at 1/16 grain per gallon was used in raw water both at Poona Cantonment and the Holkar's Bridge headworks. The dose of perchloron was 4·7 lbs. per million gallons for canal water and 16 lbs. for Pashan lake water. The annual maintenance charges amounted to Rs. 60,884 excluding annual payment of Rs. 25,000 towards purchase of these works from the Military authorities, and the total assessed revenue amounted to Rs. 1,26,826.

Satara—Hydro-electric supply.—The sanctioned scheme provides for a 9″ pipe from a double manhole at Sambarwadi to the purification works at the tunnel with a delivery of 600,000 gallons per day for 30,000 souls. The project is now modified to take advantage of the big drop available for a combined hydro-electric and water supply scheme. The works now proposed provide for a 12″ gravitation main about 3,900 feet in length from the grit chamber to settling tanks. From this settling tank a steel pipe 9″ in diameter 6,400 feet long will lead the supply to power house and tail pit, whence a 12″ pipe for a tail race 700 feet in

length will lead it to the pure water tank of 300,000 gallons capacity. The total quantity delivered to the town during the year amounted to 216 million gallons and the cost of maintenance to Rs. 9,103.

In the suburban area the total quantity of water supplied amounted to 11·5 million gallons and the annual maintenance charges to Rs. 5,771 including the cost of water paid to the Satara Municipality.

Shingnapur.—This is an important pilgrim centre in the Satara district, and large numbers of people collect during the annual Chaitra fair. A piped water supply scheme was found to be an urgent necessity, and was prepared and constructed complete by the end of 1930-31. The existing tank near the temple is the principal source of water supply, which is arranged to be conveyed from the tank through a pipe line in the culvert in the existing dam to a sump well and pumped thence to service cisterns and standposts situated in the vicinity of the temple throughout the pilgrim camping grounds.

The water in the tank is not free from organic matter and though the supply is chlorinated when pumped to the service reservoir it is not considered to be quite safe. The Fair Fund Committee was therefore advised to take early steps to eradicate the large growth of submerged weeds on the bed of the tank by continual working on a raft throughout the year.

The work of connecting the Hasan Husain springs with the supply well by means of stoneware pipes, estimated to cost Rs. 12,955, and expected to bring in an unpolluted supply in the system was sanctioned during the year and will be taken up when the tank water is depleted.

Sholapur.—Both the quantity of water supplied and the pressure in the mains have proved inadequate; considerable improvements and enlargement of works have therefore become necessary and are being carried out by the Municipality in suitable stages on the advice of the Consulting Public Health Engineer to Government. Besides the different stages of improvements already carried out by the Public Health Branch, the Municipality has now taken in hand the work of re-organizing their distribution system. The scheme is estimated to cost Rs. 5,07,500 and has been approved by the Board of Public Health Works.

The work of putting in a break pressure tank on the gravitation main and a 20″ connecting pipe from the existing stand pipe with repairs to Venturi meter was carried out by Government agency at a cost of Rs. 30,567.

The Municipality have entrusted the work of preparation of project for water purification works to the Executive Engineer, Sholapur Division, under the direction of the Consulting Public Health Engineer to Government.

The Municipality have carried out during the year improvements to the distribution system by laying of pipes varying in diameters from

4" to 24" of a total length of 12,161 Rft. and the expenditure incurred by them during the year was Rs. 1,17,962.

The total supply delivered to the town during the year amounted to 1,147 million gallons and the annual maintenance charges amounted to Rs. 1,17,824.

Sirur.—Of late the general taste of water has gone insipid though it shows a clear and sparkling appearance. On inspection it was found that the jack well from which the water is pumped has given access to ground water finding its way into it either through its bottom or sides which had to be opened out at the time of erection of the present pumping plant. As pollution is suspected, the Municipality has been advised to send samples of water for analysis to the Poona laboratory from time to time.

The present arrangement of pumping machinery was found to be faulty and the local body has been asked to get its efficiency and capacity tested by the Executive Mechanical Engineer, Dapuri.

Yeola.—The Water Works of this place are on the most conservative lines, the supply pumped from intake wells being received in the town in dipping cisterns and used only for the bare necessities of drinking and cooking purposes. All the other supply in the town is from wells yielding very brackish water. Improvements in the supply and its distribution methods are necessary, but the local people seem to be content with what little they get from the existing works (costs of which have been largely contributed by a wealthy donor and named after him) being free from any annual burden by way of taxation. The Municipality was advised as a first step at least to make the supply available from taps instead of from dipping cisterns, which are liable to pollution.

Southern Division.

Belgaum.—There is no public water supply at present, but the Municipality on their own initiative have provided one elevated water tank 12,000 gallons capacity in Math galli for use in case of fire, and for construction purposes, at a cost of Rs. 5,000; another elevated tank of 2,000 gallons capacity to be filled from a neighbouring municipal well by deep well water pump was in progress. If this is found to be sufficient for the area to be served, similar small installations are proposed to be constructed, which is expected to solve the problem of water supply especially in the eastern part of the town.

Bijapur.—As the present 14"rising main has outlived its term of life and is pitted, the Municipality proposes to replace the same by large size 16" C. I. pipes. For this purpose they have prepared, on the advice of the Consulting Public Health Engineer to Government, a project estimated to cost Rs. 1,90,866 net and have submitted it for scrutiny.

On considerations of economy, the Municipality also contemplate to go in for electric power in place of steam and are negotiating a contract with a private firm for the maintenance of the pumping station.

The total quantity of water delivered to the town during the year amounted to 231 million gallons and the annual recurring expenditure for maintenance of works amounted to Rs. 34,651 which includes Rs. 3,122 for special repairs to the pumping engines.

Chiplun.—A project estimated to cost Rs. 1,96,200 net for providing improvements to the existing water supply system has been sanctioned by the Board of Public Health Works and Government, and arranged to be constructed by Government agency at the request of the Municipality. The scheme is divided into four stages ;—

(1) Replacing the existing 6″ gravitation main by 12″ piping.

(2) Providing a service reservoir.

(3) Improvements to town distribution system, and,

(4) Improving the existing main along the Ratnagiri road and branch line for the Gowal Kop with service cistern.

The first stage is being taken up for construction immediately from funds provided by the Municipality from their balances.

Dharwar.—The Dharwar water works constructed during the year 1911–12 have continued to be insufficient for the requirements. The pumping machinery, which was overhauled recently, requires to be renewed to meet the growing demands. As the supply is received through an open trench working as a gallery surrounded by paddy fields it should be chlorinated at the service reservoir. Also as the present headworks are incapable of extension for giving more supply, the Municipality was advised to use the wells near Datta temple and also the distillery well by installing electric pumping plant and thereby supply as much of the town area as possible.

Hubli.—The works at Hubli are managed by the Municipality. The filter beds which are of Jewel type are much out of date and are presumably insufficient to deal with the growing requirements of the town. The working of these filters as regards their efficiency in quality and sufficiency in quantity should be completely recorded and reported. The pumping machinery was being overhauled during the year by the agency of the M. & S. M. railway.

The total quantity of water supplied during the year amounted to 271 million gallons and the annual working expenses were Rs. 85,730.

Khed.—The sanctioned scheme provides for the following works :—

(*a*) a small pick-up weir across Boraj nala ;

(*b*) gravitation main, 8 miles long—3½ miles of 6″ diameter hume pipes and the rest 5″ C. I. pipes ;

(*c*) a masonry service reservoir of 25,000 gallons capacity ; and

(*d*) town distribution system.

On financial considerations, at the request of the local body, the construction of the pick-up weir was first taken up and completed. Work on the service reservoir is in progress. The expenditure incurred on the work during the year was Rs. 4,986.

Mahad.—The present water supply is obtained from wells and rain water tanks, which not only run dry during hot weather but are also open to contamination. A scheme is in course of preparation, and it is proposed to convey water from an impounding reservoir from the Kurla nala by a 6″ pipe line about 2 miles in length to a service reservoir from which it will be distributed to the town. The cost of the scheme is estimated at Rs. 1,85,000 net.

Matheran.—The head works pumping station is worked by Government agency. The total supply during the year was 10·881 million gallons. The dose of perchloron was 4 lbs. per million gallons during October and November months and 3 lbs. from December to March. From July to September end the pumping station is closed for rains. The annual working expenses amounted to Rs. 5,220.

Ratnagiri.—The work of replacing the 7″ old steel gravitation main by 9″ Hume pipe was completed and the discharging capacity is now much improved. The source of supply is yet unsatisfactory during the hot weather months and surveys for a scheme for supplementing the same from a nala about 7½ miles away are in progress.

The total supply delivered to the town during the year was 79·6 million gallons (approximately 0·218 million gallons daily) at an annual cost of Rs. 6,738. The Water Works are managed by the Executive Engineer, Ratnagiri Division.

DRAINAGE SCHEMES.

Sind.

Hyderabad.—A project (I stage) for providing outfall drain and disposal works to the town of Hyderabad estimated to cost Rs. 7,27,750 net is waiting to be financed by the local body. The scheme provides for a main collecting underground sewer 18″ to 39″ in diameter to a total length of 17,300 feet with settling tanks for purification and effluent irrigation area for sewage treatment. The present sewage farms are over-charged and are most unsatisfactory, the larger one of these being quite close to the town.

Karachi.—The City is served by a water carriage system of underground drainage which the Corporation maintains in good order. Year after year as the City expands, extensive improvements to the drainage works are carried out by the Corporation. A supplementary drainage scheme for providing internal drainage to the recently developed areas and those urgently requiring drainage, estimated to cost Rs. 4,05,000 has been sanctioned by the Board of Public Health Works, and the Corporation has arranged to finance the scheme from loan funds. Advice

was given in connection with extension of sewage farm area, which is at present 261 acres only, and extension of rising main by a 33" piping 4,200 feet long.

The Corporation has carried out during the year works of laying sewer lines, air mains, and changes in pumping and compressor machinery for sewage works; the expenditure incurred on these works amounted to Rs. 36,327.

The total quantity of sewage dealt with at the drainage pumping station was 160·6 million gallons for which the annual working expenses amounted to Rs. 4,09,584 including halalkhore service (Rs. 1,06,460) and the interest and sinking fund charges for capital invested amounted to Rs. 1,53,994, making a total annual charge of Rs. 5,63,578.

Shikarpur.—The following works included in the first stage were carried out by Government agency during the year under report:—

(1) 24" *Western Intercepting sewer.*—A length of 326·5 feet was laid making a total of 1,518 feet.

(2) 18" *North Eastern Intercepting sewer.*—The whole of this line was completed last year except the last 372 feet which though laid had to be tested. Some of the pipes had sunk which were set right during the year and the final tests were in progress.

(3) *Balancing Tank well.*—The work was started in December 1933 and sinking and masonry work was done up to 24 feet and 27 feet respectively. The well showed signs of cracks while sinking and work was stopped on 30th March 1934.

(4) *Engine House.*—Pumping machinery was ordered and was expected to be received after the close of the year under report.

The expenditure incurred during the year was Rs. 62,761 gross making a total expenditure up to date of Rs. 2,52,337 gross.

The Municipality proposes to extend the collecting sewer provided in the first stage and to construct internal drainage lines so as to provide for the removal of sullage from all houses in the remaining low lying areas to connect with the underground collecting sewers provided in the first stage works. The scheme for extension of drainage scheme and other correlated works estimated to cost Rs. 5,00,476 prepared by the Municipality was approved by the Board of Public Health Works, and work on the second stage of drainage scheme estimated to cost Rs. 1,31,680 was commenced by the Municipal agency and is in progress.

Sukkur.—The town has a surface drainage system only with pumping arrangements for discharge of sullage into the river when in floods. Before the Barrage, the sullage was let into the river by gravity on non-flood days, but conditions are now changed, and the town needs to be provided with proper outfall and disposal works for service all the year round. The Municipality added 5,152 feet of surface drains during the year in different quarters of the town at a total cost of Rs. 3,465.

Northern Division.

Ahmedabad.—The present sewerage scheme of Ahmedabad was designed to deal with that part of the city which lies within the City walls and did not take into account any areas lying outside or of any industrial concerns. On account of the railway station area and few mills being connected to the existing system some main drains are being surcharged and causing nuisance. In response to the pressing demands of the millowners and the general public of the suburban area, the Ahmedabad Municipality are contemplating the extension of their drainage system outside the city walls to include practically all industrial concerns and the suburban population. As this scheme will involve a very high capital outlay, the Municipality propose for the present merely to construct a portion of the trunk sewer (forming the first stage of the suburban drainage scheme), estimated to cost Rs. 7,49,540. This sewer will disconnect certain areas from the existing system and thus give immediate relief to the old system and prevent overflows and consequent nuisance. The project has been approved by the Board of Public Health Works and the Municipality intends to take in hand the work as soon as their loan is sanctioned. The rehauling of the Jamalpur pumping station and laying of 42" main collecting sewer in the western portion of the town as provided in the sanctioned scheme were in progress, as also the laying of many branch sewers. These were all carried out by the Municipality.

The sewage farm is yet not fully developed and although extended during the year by acquiring more land, there is a considerable quantity of sewage that is let directly into the river Sabarmati before and after pumping. Experiments were made by the Municipality for disposal of sewage by intermittent downward filtration by laying out a small area of about 1½ acres and the conditions of soil have proved to be favourable for this method of disposal, which the Municipality is now arranging to extend by laying out about 40 acres.

The total quantity of sewage dealt with by the pumping station amounted to 1076·7 million gallons and the annual working expenses amounted to Rs. 63,882. The full quantity of sewage from the sewered area is much greater than that pumped and is at present only overflowed into the river.

Bandra.—The project for Bandra drainage (estimated to cost Rs. 7,32,200) which was prepared as long back as 1929 has been approved by the Board of Public Health Works after a lot of correspondence with the Bombay Port Trust and the Bombay Municipality as regards point of outfall. The scheme provides for drainage on a separate system with underground sewers, pumping machinery, balancing tank, rising main, settling tank and effluent main, discharging below low water level in the Mahim creek. The Municipality is waiting sanction to loan for financing the scheme.

Khar.—A project for providing drainage to the Khar Model Suburb at Bandra estimated to cost Rs. 1,43,000 has been approved by the Board of Public Health Works. It provides for serving most of the recently developed areas of Khar suburb comprising 487 plots with a population of 6,555. The Municipality intend to execute the scheme through their own agency as soon as their loan is sanctioned.

Kapadwanj.—The work of providing sewers in bye-lanes which was for some time held in abeyance owing to want of contribution from the Municipality has now been taken up for execution by themselves. Piecemeal works as and when funds are available, are being taken up under the supervision of the Public Works Department but for convenience of scrutiny the local body has been advised to chalk out a general programme of the works to be taken up for at least one year ahead. A total length of 395 feet of branch drains was laid during the year by the Municipality at a cost of Rs. 1,009.

Surat.—A commencement was made with the first stage of the drainage scheme viz., laying a collecting drain in Khadi nala, but further work was asked to be held in abeyance by the Municipality pending consideration of the whole sewerage scheme for Surat. The local body is desirous of undertaking a complete underground drainage and is considering the ways and means to finance the scheme. The location of the sewage farm for the full scheme has been a matter of much opposition from the local people and its final settlement is not yet decided, though the special drainage committee of the Municipality have approved of its location on the Majura gate side farther from the site previously suggested.

Central Division.

Ahmednagar.—The town of Ahmednagar cannot boast of a proper drainage system. There are old underground drains to which house connections are made. Owing to paucity of funds with the Municipality, the drainage scheme estimated to cost Rs. 1,04,100 net prepared as long back as 1928 could not be taken up for construction. The Municipality have therefore resorted to temporary arrangements for disposal works and are spending annually Rs. 8,000 to Rs. 10,000 from their general resources in constructing new internal surface drains in areas not provided with any drainage.

During inspection of the town it was noticed that the Municipality have constructed an earthen channel about a mile long along the bank of the river evenly graded so as to enable sullage being discharged into the Sina river bed downstream of the town. The channel is liable to damage and is useless during floods and is required to be constructed every year. The urgent necessity to provide for permanent disposal works by providing proper outfall sewer was pointed out to the Municipality, as the sullage discharge into the river on account of the construction of more surface drains would be continually on the increase and would be a menace to the general health of the town.

Amalner.—The Amalner drainage scheme, I stage, estimated to cost Rs. 66,453 net, provides for an outfall sewer, settling tank and main drains in the western portion of the town. The site for the sewage farm as provided in the sanctioned scheme being objected to locally was reconsidered and Survey No. 39 was finally fixed in consultation with the Director of Public Health. About 1,650 feet of open drains and 580 feet of 12" stoneware collecting sewer were laid and four manholes constructed,—all the work being done by Government agency.

Dhulia.—The main drainage scheme sanctioned in the year 1925 and under construction by Government agency has been practically completed and handed over to the Municipality, except a water pipe connection to the pail depôt; the expenditure incurred during the year was Rs. 955.

The Municipality are now supplied with a project which provides for relaying old surface drains in the new Dhulia estimated to cost Rs. 23,050. The Municipality propose to take the works in hand soon. The sewage farm area acquired for disposal works is not yet brought into operation.

Nandurbar.—The drainage portion as included in the first stage of the water supply scheme has been completed and handed over to the Municipality for maintenance,—the expenditure incurred on the first stage being Rs. 5,073.

In the second stage, about 14,000 feet of 9", 6" and 4" diameter S. W. pipes were laid and 119 manholes and inspection chambers and 9 flushing tanks were constructed. The expenditure incurred during the year was Rs. 37,926 net.

The question of taking up the third stage is awaiting acceptance of alternative site for sewage farm as proposed by the Municipality.

Plans and estimate for work of lateral drains forming the IV stage of the project were under preparation by the Executive Engineer, Khandesh Division.

Nasik Road Central Prison.—The work of extension of sewage farm by acquiring more land, fencing it, and extending the 9" half round channel was completed during the year. Expenditure Rs. 8,001.

Pandharpur.—The work of the 24" concrete outfall sewer estimated to cost Rs. 55,296 gross and designed to discharge sullage water from the whole of the town area in Gopalpura nala and through it into the river below the Vishnu Pad point which is considered to be sacred and often visited by pilgrims, was in progress. Out of the total length of 3,440 feet, about 2,560 feet had been laid by the end of last year. The remaining work which was held in abeyance pending receipt of funds from the Municipality was arranged to be started and the work was expected to be completed before the river level had risen due to floods in the next monsoon.

Poona.—The Poona Drainage Improvement Scheme sanctioned in 1925 in two sections was still in progress. The first section works are carried out partly by Government agency and partly by the Poona City Municipal agency.

The works constructed by Government agency during the year were :—

(1) the laying of branch sewers for a total length of 2,926 feet varying from 6″ to 15″ in size with 100 house connections ;

(2) the construction of the Mangalwar peth subsidiary low level pumping station ; only the erection of electric pumping machinery remains to be completed.

The expenditure incurred during the year was Rs. 72,462.

The works constructed by municipal agency during the year were the laying of branch drains to a total length of 6,086 feet varying from 6″ to 12″ in diameter and making 279 extra house connections with 3 flushing urinals at a total cost of Rs. 55,077 net.

The total expenditure on 1st section works including that incurred by municipal agency amounted to Rs. 27,56,430 against a sanctioned amount of Rs. 34,22,688 excluding land compensation amount, the expenditure on which was Rs. 1,02,420 incurred by the Municipality up to date.

Second section works—These are wholly financed from Provincial funds. A new electric pumping set of capacity of 420,000 gallons per hour at high speed (740 RPM) to 350,000 gallons per hour at low speed (675 RPM) was erected complete and put into operation from 25th December 1933. There are in all now four pumping sets, of which the two installed in 1929 are oil engine sulzer plants of two stroke type of 150,000 gallons per hour capacity each,—the one installed in 1931 is a Rustom oil engine with a Mather and Platt's pump of 150,000 gallons per hour capacity and the fourth one is the one above referred to. The screen and grit elevator machinery is worked daily and the balancing tanks are cleared of sludge once a year by gravity discharge when the river is in floods. The pumping machinery is worked for about 20 hours every day and the total quantity of sewage pumped amounted to 1936 million gallons during the year or an average of 5·71 million gallons daily with 339 working days ; for the rest of the days, the sewage was discharged into the river when in floods. The total expenditure incurred on the second section is Rs. 15,25,106 net and Rs. 19,72,642 gross against the sanctioned estimated cost of Rs. 15,64,048 net and Rs. 19,39,420 gross respectively.

The daily quantity of sewage for which the works are designed is 7·1 million gallons. This is likely to be exceeded very soon as other areas are joined on and proposals for additional disposal works are under contemplation.

The cost of annual maintenance for working the pumping station and outfall works amounted to Rs. 90,829. The effluent distribution scheme which is worked by the Irrigation Department had a total acreage of 1,683 under irrigation, of which 1,100 to 1,200 acres were under sugarcane during the previous year. The net revenue from effluent irrigation amounted to Rs. 46,110. Corresponding figures for the year under report are not yet available.

Poona Suburban Internal Drainage.—The work of providing an underground drainage in the suburban area was completed to the extent of sanctioned provision. A total length of 4,864 feet of branch sewers 6″ to 12″ in size were laid with necessary accessories of manholes, flushing tanks etc. and 25 house connections at a cost of Rs. 28,732 gross during the year.

Poona Cantonment Drainage.—Construction of a partial internal drainage scheme for the Cantonment area has not yet been taken up by the Cantonment Authority pending transfer of financial responsibility for half share (0·75 million gallons a day) of cantonment sewage quantity to the Poona City Municipality.

Sholapur.—Extension of outfall sewer—Extensive improvements to Sholapur drainage have been in progress in recent years and it is now proposed to extend the scheme by laying a further length of 5,565 feet of 33″ Hume pipe outfall sewer which will remove the sullage further away from the inhabited area and which will also serve the proposed plots of the Town Planning Scheme No. 2. This project estimated to cost Rs. 75,200 has been sanctioned by the Board of Public Health Works and will be taken up for execution by the Municipality as soon as their loan is sanctioned.

Preparation of project for the further portion of outfall sewer and disposal works has been entrusted to the Executive Engineer, Sholapur Division, which is being done under the direction of this office.

SOUTHERN DIVISION.

Belgaum.—The scheme of drainage drawn up for providing new surface drains and three main underground collecting drains for conveying the sullage to settling tanks and disposing of the effluent by irrigation, which was being carried out by Government agency, was completed and handed over to the Municipality for maintenance during the year under report.

The sewage farm is not yet arranged for; it appears the Municipality is giving up the idea of acquiring land on the ground of its cost being prohibitive. The effluent is at present thus only let into an adjoining nala. It has been pointed out to the Municipality that satisfactory arrangement for disposal of sullage should be made by them by way of at least constructing artificial disposal works.

The Municipality undertook quite a large number of surface drainage works during the year, estimated to cost Rs. 55,437, the expenditure incurred being Rs. 23,479 for a length of 10,304 rft.

Bijapur.—The Municipality undertook the construction of surface drains during the year estimated to cost Rs. 3,603, the expenditure being Rs. 2,568 for a length of 2,346 feet.

Gadag Bettigeri.—Stages I and II of the sanctioned drainage scheme for V shaped open surface drains have been completed and handed over to the Municipality. Extension of the major surface drainage scheme as included in the estimate for " Extra surface drains " carried out by Government agency was in progress during the year and expenditure on the same amounted to Rs. 9,350.

Side by side with Government agency's work the Municipality prepared a supplementary scheme for branch surface drains estimated to cost Rs. 32,777 of which they constructed by their own agency 41 branch lines varying each from 100 feet to 500 feet in length and of types adopted in the work approved and carried out by Government agency. The cost of the work done by municipal agency was Rs. 27,741.

The construction of the III stage consisting of a settling tank, estimated to cost Rs. 21,500 net, is held up for want of contribution from the Municipality. It is proposed now to revise the III stage of the project to make provision for a common sedimentation tank for Gadag and Bettigeri towns and connecting the Gadag sullage flow from the railway bridge to Bettigeri by one 12" S. W. or Hume pipe sewer. It is expected that the Municipality will arrange to take in hand the work soon.

GENERAL.

The Consulting Public Health Engineer to Government together with the Assistant Consulting Public Health Engineer visited as many towns in the Presidency as could possibly be done and after discussing with local authorities the requirements and deficiencies of existing installations issued inspection reports for the following :—

Sind.	Northern Division.	Central Division.	Southern Division.
Hyderabad Water Supply and Drainage.	Ahmedabad Drainage.	Ahmednagar Water Supply and Drainage.	Belgaum Drainage.
Jacobabad Water Supply.	Bandra Drainage	Amalner Drainage.	Bijapur Water Supply.
Karachi Water Supply and Drainage.	Broach Water Supply.	Bhimashankar Water Supply.	Chiplun Water Supply.
Shikarpur Drainage.	Surat Water Supply and Drainage.	Dhulia Water Supply.	Dharwar Water Supply.
Sukkur Water Supply.	Thana Water Supply.	Jalgaon Water Supply.	Gadag Bettigeri Drainage.
		Karad Water Supply.	Hubli Water Supply.
		Kopargaon Water Supply.	Khed Water Supply.
		Lonavla Water Supply.	Mahad Water Supply.
		Malegaon Water Supply.	Pen Water Supply.
		Nandurbar Water Supply. and Drainage.	Ratnagiri Water Supply.
		Nasik Water Supply.	
		Pandharpur Water Supply.	
		Satara Water Supply.	
		Shingnapur Water Supply.	
		Sholapur Water Supply and Drainage.	
		Sinnar Water Supply.	
		Sirur Water Supply.	
		Yeola Water Supply.	

It is indeed gratifying to note that local bodies have been much benefited by the advice given on the spot and are taking action on the reports as far as their finances permit.

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The Consulting Public Health Engineer was also engaged in supervision of the following Public Health works of Indian States :—

(1) Jawhar Water Supply ;
(2) Kurundwad Water Supply ; and
(3) Akalkot Water Supply.

These works were visited as often as the local administration required and the works at all these places are now sufficiently advanced and are showing good progress.

The total expenditure on Public Health works carried cut by Government agency (P.W.D. staff) amounted to Rs. 7,10,174 and the total Government grant-in-aid to cover centage charges or rebate amounts under previous commitments or new orders after re-organization to Rs. 64,950.

The total amount of fees actually recovered for preparation, scrutiny or supervision of Public Health works of local bodies amounted to Rs. 11,275 during the year and those for which demands have been made but not recovered amounted to Rs. 1,10,833.

It has been noticed that no attempt is made by the local bodies either to keep or maintain the annual statistical data of the operation of these very important Public Health works.

With the progress of time and increase in population and consequent demand for more amenities, it is becoming clear that the provisions made in the past have always required revision earlier than was forecast. It is therefore necessary that each local body having a public water supply or drainage system should have a separate annual report of its working made out and recorded, to enable improvements to be considered sufficiently in advance and in good time to make financial arrangements to provide extensions.

There is much room for progress in providing amenities of water supply and drainage and directly helping to raise the standard of health throughout the Presidency.

The following table will indicate the population of the municipal towns in the whole Presidency that have been provided with water supply and that still remain to be served :—

Bombay British Districts and their population.		Population under Local Authorities, Municipalities or Notified Area Committees.	Population to which water supply is provided.	Population without public water supply.
(1) Sind ..	3,887,070	643,831	350,289	293,542
(2) Northern Division.	4,060,352	804,031	688,440	115,591
(3) Central Division	7,372,637	1,120,023	753,356	366,667
(4) Southern Division.	5,397,681	556,184	261,526	294,658
Total ..	20,717,740	3,124,069	2,053,611	1,070,458

V. G. SHETE,
Secretary,
Board of Public Health Works,
Bombay Presidency.

Poona, 8th October 1934.

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